A-68944

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

STUART J. KNOWLES, ET AL.

Serial No. 09/615,294

Filed: July 13, 2000

For: METHOD OF MANUFACTURING A TUNING FORK WITH REDUCED QUADRATURE ERROR AND SYMMETRICAL MASS BALANCING

Examiner:
Anthony Dexter Tugbang

Group Art Unit 3729

April 24, 2006

REPLY BRIEF

CERTIFICATE OF FACSIMILE TRANSMISSION

I CERTIFY THAT THIS AMENDMENT IS BEING FORWARDED TO THE PATENT OFFICE FOR FILING VIA FACSIMILE TRANSMISSION TO (571) 273-8300 ON April 24, 2006.

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UNDERSTANDING OF THE INVENTION

Even though the Examiner now says that he understands the invention and the differences between it and the prior art, he has still failed to come to grips with those differences, and they are lost in the arguments made in his Answer. The Examiner also seems to lose sight of the fact that the claims on appeal are method claims, not device claims.

As pointed out in Appellant's opening brief, there is a fundamental difference between applicant's invention in which balancing masses are utilized on the tines of a tuning fork to eliminate quadrature vibration and to maintain a balance in mass between the tines and the teachings of Macy where pickup electrodes are trimmed to produce an electrical null in the quadrature signal. One is a mechanical technique; the other is electrical.

The Examiner tries to bridge the gap between the electrical technique of Macy and the mechanical technique of the invention by arguing that the electrodes shown in Macy have some mass and that they are trimmed mechanically by the same technique as the balancing masses in applicant's invention. That, however, misses the point and ignores the fact that the trimming is done in Macy to alter the symmetry of the electrodes to produce an electrical nulling of the quadrature signal, not to reduce quadrature displacement and maintain a balance in mass between the tines as in appellant's invention. The invention is not the mechanism or the technique used for the trimming or removal of unwanted material, but rather the use of balancing masses to reduce quadrature displacement and maintain a balance in mass between the tines.

SYMMETRY AND BALANCE

The Examiner's characterization of Macy as "utilizing the same mechanical techniques to achieve physical symmetry and balance of the tines" is both misleading and inaccurate. That characterization is said to be based upon Col. 4, lines 47 - 52, the pertinent portion of which reads as follows:

> In order to minimize the capacitive coupling between the leads, the electrodes heretofore described are disposed to achieve as closely as possible physical symmetry or balance.

This particular paragraph is concerned with minimizing capacitive coupling, not with the balancing of any masses, and the term "balance" is used in reference to the positioning of the electrodes, not the tines or any masses associated with them. In that regard, it will be noted that the conjunction actually used between "physical symmetry" and "balance" in Macy is the alternative "or", not "and" as suggested by the Examiner. Thus, "balance" is used simply as a synonym or an alternative for "symmetry", and the passage in no way supports a suggestion that Macy achieves physical symmetry and balance of th tines.

OPPOSITE SIDES

In arguing that some of the electrodes which are trimmed in Macy may be on the front and rear surfaces of the tines or on opposite sides of the tines, the Examiner has once again missed the point and failed to address what is actually claimed. To meet the language of the claims, it is not enough to trim electrodes on various sides of the tines to make them more or less symmetrical. That is not reducing quadrature displacement and maintaining a balance in mass as specified by the claims

GENERALIZATIONS VERSUS DETAILED ANALYSIS OF CLAIMS

Rather than addressing the claims on a limitation by limitation basis, the Examiner has instead made generalized statements and arguments in which the teachings of the reference are taken out of context and confused with the invention.

Claim 4, for example, distinguishes over Macy in calling for the use of balancing masses on the front surface of one tine and the rear surface of the other tine to reduce quadrature displacement in the tines and maintain a balance in mass between the tines. Macy does not teach or even remotely suggest the use of balancing masses on the front of one tine and the rear of the other to reduce mechanical vibration in the tines or to maintain a balance in mass between the tines.

Similarly, Claim 5 distinguishes over Macy in calling for the steps of applying mass elements to the tines, and removing portions of the mass elements from the front surface of one tine and from the rear surface of the other to reduce quadrature displacement in the tines and maintained a balance in mass between the tines. Here again, Macy fails to teach or even remotely suggest the application and removal of mass elements to reduce mechanical vibration in the tines or to maintain a balance in mass between the tines.

Claim 6 distinguishes over Macy in calling for the step adding mass elements to the front surface of one tine and the rear surface of the other tine to eliminate quadrature displacement in the tines and maintain a balance in mass between the tines. As noted above, Macy fails to teach or suggest the addition of mass elements to the front surface of one tine and the rear surface of another to reduce mechanical vibration in the tines or to maintain a balance in mass between the tines.

Claim 7 distinguishes over Macy in calling for the steps of forming a pair of elongated tines having free ends of increased lateral dimension with laterally offset balancing masses on opposite sides of the tines near the free ends, and adjusting the balancing masses on opposite sides of the two tines to reduce quadrature displacement in the tines and maintain a balance in mass between the tines. Macy does not show or suggest the formation of tines having either free ends of increased lateral dimension or laterally offset balancing masses on opposite sides of the tines near the free ends, nor does it show or suggest adjusting the balancing masses on opposite sides of the two tines to reduce mechanical vibration

in the tines and maintain a balance in mass between the tines. Without those steps, it does not anticipate the subject matter of Claim 7, nor does it render that subject matter obvious.

Claims 8 and10 depend from Claim 7 and are directed to patentable subject matter for the same reasons as their parent claim. In addition, Claim 8 further distinguishes over Macy in specifying that the balancing masses are adjusted by removing substantially equal amounts of the balancing masses from the opposite sides of the tines, and Claim 10 further distinguishes in calling for the step of removing substantially equal amounts of the balancing masses from same sides of the tines to adjust the drive mode frequency of the tuning fork.

Claim 11 distinguishes over Macy in calling for the steps of forming both drive and pickup tines, applying balancing masses to the front and rear surfaces of the drive tines, and trimming the balancing masses on opposite sides of the drive tines to reduce quadrature displacement without affecting mass balance between the drive tines. Macy is concerned with a single ended tuning fork in which a single set of tines is used both in the drive mode and in the pickup mode, and it does not show or suggest the formation of separate drive and pickup tines. It likewise does not show or suggest either the application of balancing masses to the front and rear surfaces of drive tines or trimming balancing masses on opposite sides of the drive tines to reduce quadrature displacement without affecting mass balance between the drive tines. Hence, it does not anticipate or render obvious the method of Claim 11.

Claims 12 and 13 depend from Claim 11 and are directed to patentable subject matter for the same reasons as their parent claim. In addition, Claim 12 further distinguishes in calling for the step of trimming the masses on same sides of the drive tines to adjust the drive mode frequency of the tuning fork, and Claim 13 further distinguishes in calling for the steps of providing masses on the pickup tines, and trimming the masses on the pickup tines to adjust the pickup mode frequency of the tuning fork.

Claim 14 distinguishes over Macy in calling for the steps of applying balancing masses to the front and rear surfaces of the tines, trimming the balancing masses if necessary to provide a balance in mass between the two tines, and thereafter removing substantially equal amounts of the balancing masses from the front surface of one of the tines and from the rear surface of the other tine to reduce quadrature displacement in the tines and maintain the balance in mass between tines. Without those steps, Macy does not anticipate or render the method obvious.

Claim 15 depends from Claim 14 and is directed to patentable subject matter for the same reasons as its parent claim. In addition, it further distinguishes in calling for the step of removing substantially equal amounts of the balancing masses from same sides of the tines to adjust the drive mode frequency of the tuning fork.

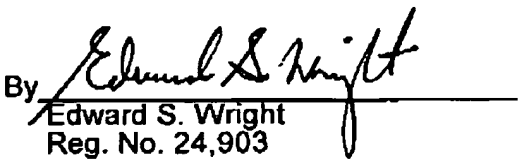
Claim 16 distinguishes over Macy in calling for the steps of forming elongated pairs of drive and pickup tines which have front and rear surfaces and extend in opposite directions from a central body, applying balancing masses to the front and rear surfaces of the drive tines, trimming the balancing masses if necessary to provide a balance in mass between the drive tines, and thereafter removing substantially equal amounts of the balancing masses from the front surface of one of the drive tines and from the rear surface of the other drive tine to reduce quadrature displacement in the drive tines and maintain the balance in mass between them. As noted above, Macy does not show or suggest the formation of a tuning fork having drive and pickup tines which extend in opposite directions from a central body, nor does it show or suggest applying balancing masses to the front and rear surfaces of the drive tines, trimming the balancing masses if necessary to provide a balance in mass between the drive tines, and thereafter removing substantially equal amounts of the balancing masses from the front surface of one of the drive tines and from the rear surface of the other drive tine to mechanical vibration displacement in the drive tines and maintain the balance in mass between the tines. Without those steps, Macy does not anticipate or render the invention obvious.

Claims 17 and 18 depend from Claim 16 and are directed to patentable subject matter for the same reasons as their parent claim. In addition, Claim 17 further distinguishes in calling for the step of removing substantially equal amounts of the balancing masses from same sides of the drive tines to adjust the drive mode frequency of the tuning fork, and Claim 18 further distinguishes in calling for the steps of applying balancing masses to the pickup tines and removing substantially equal amounts of the balancing masses from same sides of the pickup tines to adjust the pickup mode frequency of the tuning fork.

SUMMARY AND CONCLUSION

For the reasons set forth above and in applicant's opening brief, it is once again respectfully submitted that the rejection which the Examiner has made cannot be sustained and that the action of the Examiner should be reversed.

Respectfully submitted,

By 
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